

(12) United States Patent

Akiyama et al.

US 9,636,916 B2 (10) Patent No.: (45) Date of Patent: May 2, 2017

(54) INK TEMPERATURE ADJUSTMENT DEVICE AND INK CIRCULATION TYPE INKJET PRINTER HAVING THE SAME

(71) Applicant: RISO KAGAKU CORPORATION,

Tokyo (JP)

(72) Inventors: Tomoyuki Akiyama, Ibaraki (JP);

Asavo Shimoda, Ibaraki (JP); Hiroshi Sugitani, Ibaraki (JP); Akira

Nishiyama, Ibaraki (JP)

(73) Assignee: RISO KAGAKU CORPORATION,

Tokyo (JP)

Notice: Subject to any disclaimer, the term of this

patent is extended or adjusted under 35

U.S.C. 154(b) by 0 days.

(21) Appl. No.: 14/826,460

Filed: Aug. 14, 2015 (22)

(65)**Prior Publication Data**

> US 2016/0059565 A1 Mar. 3, 2016

(30)Foreign Application Priority Data

Aug. 28, 2014 (JP) 2014-173886

(51) Int. Cl.

B41J 2/175 (2006.01)B41J 2/195 (2006.01)

(52) U.S. Cl.

CPC B41J 2/175 (2013.01); B41J 2/195 (2013.01)

(58) Field of Classification Search

See application file for complete search history.

(56)References Cited

U.S. PATENT DOCUMENTS

4,149,390 A *	4/1979	Iijima F25B 39/02
5 600 675 A *	12/1007	165/176 Nagai F25B 9/006
5,099,075 A	12/1997	165/150
6,174,055 B1*	1/2001	Sugikubo B41J 3/4078
7,427,116 B2*	9/2008	347/18 Nakamura B41J 25/308 347/22

(Continued)

FOREIGN PATENT DOCUMENTS

CN	102036829	4/2011	
CN	103223782	7/2013	
	(Continued)		

OTHER PUBLICATIONS

Extended European Search Report for EP 15182523.9 having a mailing date of Feb. 5, 2016.

Primary Examiner — Matthew Luu Assistant Examiner - Lily Kemathe (74) Attorney, Agent, or Firm — Greenblum & Bernstein, P.L.C.

(57)ABSTRACT

An ink temperature adjustment device and an inkjet printer include an ink temperature adjustment path connected to a midway point on an ink supply path for supplying ink to an inkjet head configured to form an image by ejecting the ink. The ink temperature adjustment path is for adjusting a temperature of the ink supplied to the inkjet head. The ink temperature adjustment path includes an upflow path for the ink to flow upward and a downflow path for the ink to flow downward. A total cross-sectional area of the upflow path is larger than a total cross-sectional area of the downflow path.

8 Claims, 5 Drawing Sheets

